

REMARKS/ARGUMENTS

Support for the amendment to Claim 1 is found at specification page 6, line 27 - page 7, line 24. This same section of the specification and the Examples support new Claims 37-41. New Claims 42 and 43 are supported at specification page 7, lines 25-29. New Claim 44 is supported at specification page 6, lines 25-26. No new matter has been entered.

As noted above, the claims have been amended to require one of variants (1) or (2) such that either the contents of the reactor are caused to further react until the quantity of (B) consumed by the reaction no longer changes (variant (1)), or the reaction in progress is stopped (variant (2)). In each of these variants the relative amounts of (A), (B) and (C) introduced into the reactor are specially fine-tuned such that the benefits of the invention as described in the specification are obtained. None of the applied references disclose or suggest the process that Applicant is here claiming.

The cited Helv. Chim. Acta article from 1945 focuses on the study of the mechanism of the oxidizing action of benzoyl peroxide, in the presence of iodine, on certain unsaturated hydrogenated hydrocarbons. As specified at page 1 of the translation (page 558 of the original article), iodine is a *catalyst* in the reactions studied, and thus the purpose of the article is clearly not to discuss the synthesis of iodinated organic substances. It is not surprising, then, that the article does not disclose the limitations of either of variant (1) or (2) herein, which include certain limits of the relative amounts of (A), (B) and (C) introduced into the reactor. In this regard, the table below summarizes the data disclosed in the Helv. Chim. Acta article (references are to the original article):

Reference of the data	Number of moles of (A)	Number of moles of (B)	Number of moles of (C)	(C)/(A) (%)	(C)/(B) (%)
p. 566, a), 1 <sup>st</sup> paragraph	11 $10^{-3}$	11 $10^{-3}$	7.8 $10^{-3}$	70.91	70.91
p. 566, a), 9 <sup>th</sup> paragraph	5.7 $10^{-3}$	5.7 $10^{-3}$	2.7 $10^{-3}$	47.37	47.37
p. 567, 10 <sup>th</sup> paragraph	11 $10^{-3}$	11 $10^{-3}$	7.8 $10^{-3}$	70.91	70.91
p. 567, 12 <sup>th</sup> paragraph	5.5 $10^{-3}$	5.5 $10^{-3}$	2.7 $10^{-3}$	49.09	49.09
p. 568, c), 1 <sup>st</sup> paragraph	24.8 $10^{-3}$	29.4 $10^{-3}$	8.2 $10^{-3}$	33.06	27.89
p. 568, c), 6 <sup>th</sup> paragraph	5.4 $10^{-3}$	10.8 $10^{-3}$	3.96 $10^{-3}$	73.33	36.67
p. 570, 3 <sup>rd</sup> paragraph	48 $10^{-3}$	48 $10^{-3}$	23.6 $10^{-3}$	49.17	49.17

As seen from this data, the conditions under which the reactions proceed are such that at least one of the (C)/(A) or (C)/(B) ratios are outside those defined for variants (1) and (2) in the pending claims:

Variant (1): the number of moles of (C) introduced into the reactor expressed relative to the number of moles of (A) introduced into the reactor is greater than or equal to 90% and less than 200% and the number of moles of (C) introduced into the reactor expressed relative to the number of moles of (B) introduced into the reactor is more than 0.5% and less than 200%;

Variant (2): the number of moles of (C) introduced into the reactor expressed relative to the number of moles of (A) introduced into the reactor is greater than or equal to 20% and less than 100% and the number of moles of (C) introduced into the reactor expressed relative to the number of moles (B) introduced into the reactor is greater than or equal to 0.01% and less than 5%.

As shown by the following Table, the examples of record in the Specification meet these limitations:

Example	Variant	Number of moles of (A)	Number of moles of (B)	Number of moles of (C)	(C)/(A) (%)	(C)/(B) (%)
1	2	$1.95 \cdot 10^{-4}$	$1.56 \cdot 10^{-2}$	$1.15 \cdot 10^{-4}$	58.97	0.74
2	2	0.0056	0.1163	0.0031	55.36	2.67
3	1	0.0056	0.1163	0.0059	105.36	5.07
4	2	0.0056	0.116	0.0031	55.36	2.67
5	1	0.0052	0.116	0.0055	105.77	4.74

It is thus clear the Helv. Chim. Acta article does not disclose or suggest the present invention, and the rejection over this reference should be withdrawn.

Similarly, the obviousness rejection over Chambers in view of the March textbook and Moczygemba should be withdrawn as even the combination of these references fail to disclose the process presently claimed now including one of variants (1) and (2) and further requiring specific reactant ratios for each of the identified variants. Nowhere in any of the cited references are the steps of the claimed process as now claimed disclosed. In this regard, the Examiner may not dismiss the limitation of, e.g., reactant ratios and instead must consider these limitations in rejecting the claims.

Chambers, the primary reference, completely fails to disclose the use of one of Applicants' critical ingredients - a free radical generating substance. Instead, Chambers specifically avoids such use, instead relying on UV or gamma radiation (page 88). Even if one were to change this reaction by introducing another chemical specie into the reaction as postulated in the rejection (no explanation or motivation for so doing is provided), one would not arrive at the particularly claimed process as presently claimed. For this reason the rejection should be withdrawn.

As the Examiner will note, the above amendment to the specification addresses the objection thereto by providing a Brief Description of the Drawings. No such description is

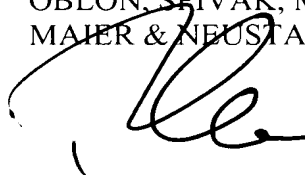
necessary in the Abstract. In addition, the Examiner's attention is directed to specification page 4 where examples of claimed free-radical-generating substances are provided. In this regard it is to be noted that the materials listed in the claims are described both by chemical structure and function (free-radical-generating ability) and thus clearly apprise one of ordinary skill in the art of what is being claimed. For the Examiner's reference, an excerpt from the Journal of Polymer Science defining iniferters as initiators that induce radical polymerization that proceeds via initiation, propagation, primary radical termination, and transfer to initiator is attached. The requirements of 35 U.S.C. 112 have been met.

Finally, Applicants submit that the obviousness-type double patenting rejection has been overcome by Applicants above amendment, and this rejection should be withdrawn. Should the Examiner finally determine that a Terminal Disclaimer is necessary to place this case in condition for allowance it is requested that the below-signed attorney be contacted by telephone in order to expedite handling.

Accordingly, Applicants submit that this application is in condition for allowance, and early notification to this effect is earnestly solicited

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.



---

Richard L. Treanor  
Attorney of Record  
Registration No. 36,379

Customer Number  
**22850**

Tel: (703) 413-3000  
Fax: (703) 413-2220  
(OSMMN 08/07)

<http://www3.interscience.wiley.com/journal/72502696/abstract?CRETRY=1&SRETRY=0>

Journal of Polymer Science Part A: Polymer Chemistry

See Also:

- Journal of Polymer Science Part B: Polymer Physics

Volume 38 Issue 12, Pages 2121 - 2136

Published Online: 18 May 2000

Copyright © 2000 Wiley Periodicals, Inc., A Wiley Company

### **Iniferter concept and living radical polymerization**

Takayuki Otsu

1-3-6, Gakuen-Midorigaoka, Nara 631-0026, Japan

#### **Keywords**

iniferter; living radical polymerization; dithiocarbamate; thiuram disulfide; block and graft copolymers; photopolymerization; controlled synthesis

#### **Abstract**

**Iniferters are initiators that induce radical polymerization that proceeds via initiation, propagation, primary radical termination, and transfer to initiator.** Because bimolecular termination and other transfer reactions are negligible, these polymerizations are performed by the insertion of the monomer molecules into the iniferter bond, leading to polymers with two iniferter fragments at the chain ends. The use of well-designed iniferters would give polymers or oligomers bearing controlled end groups. If the end groups of the polymers obtained by a suitable iniferter serve further as a polymeric iniferter, these polymerizations proceed by a living radical polymerization mechanism in a homogeneous system. In these cases, the iniferters (C—S bond) are considered a dormant species of the initiating and propagating radicals. In this article, I describe the history, ideas, and some characteristics of iniferters and living radical polymerization with some iniferters that contain dithiocarbamate groups as photoiniferters and several compounds as thermal iniferters. From the viewpoint of controlled polymer synthesis, iniferters can be classified into several types: thermal or photoiniferters; monomeric, polymeric, or gel iniferters; monofunctional, difunctional, trifunctional, or polyfunctional iniferters; monomer or macromonomer iniferters; and so forth. These lead to the synthesis of various monofunctional, telechelic, block, graft, star, and crosslinked polymers. The relations between this work and other recent studies are discussed. © 2000 John Wiley & Sons, Inc. *J Polym Sci A: Polym Chem* 38: 2121-2136, 2000